**REMARKS**

The Office Action of August 27, 2004 presents the examination of claims 1-19, 34-37, 39 and 40. Claim 39 is indicated as allowed.

The Advisory Action of December 8, 2004 addresses claims 36, 39 and 41-52, though denying entry of the Amendment filed November 29, 2004.

Upon entry of the present Amendment claims 1-19, 34-35, 37 and 40 are canceled. Claims 36, 39 and 41-58 are now pending. New claims 41-51, dependent upon claim 39 and reciting limitations from among the previous claims 2-19, 34 and 35, are now pending and should be allowable. New claim 52 is directed to the subject matter of the prior claim 34 combined with the features of allowed claim 39. Claim 52 is written in independent form because the order of the formation of the polymeric material and of the viologen salt are switched between claims 39 and 52. New claims 53 and 56 constitute alternative embodiments of the original claim 5, rewritten into independent form. Claims 53 and 56 find support in the specification at, e.g. page 9, lines 9-14. New claims 54, 55, 57 and 58 include features of the original claims 15 and 19.

Claim 39 is amended to provide antecedent basis for the recitations of claim 42.

This method of amendment was chosen for its editorial simplicity.

Rejections over prior art

The prior art rejections of record are all overcome as to the present pending claims save 36 and 52-58, as all are dependent from allowed claim 39. Applicants submit that none of the rejections or record are applicable to the present claims 52-58. The rejection of claim 36 over Afzali-Ardakani in view of Kato, IBM, Beratan, Pohl '233, and Renbaum is respectfully traversed.

As to claim 36, this claim recites the feature of *in situ* formation of the viologen salt upon the substrate and then coating with a polymeric material that the Examiner found to confer patentability upon claim 39. The Examiner might review again step b) of claim 36. Accordingly, claim 36 should be allowable for the same reasons that claim 39 is allowable.

As to claims 52-58, Applicants submit that the combination of Afzali-Ardakani, Kato, IBM, Beratan, Pohl '233 and Renbaum fails to establish *prima facie* obviousness of the claimed invention. Applicants take note of the Examiner's statement in the Office Action of April 28, 2004 that, "... the prior art of record does not teach or suggest forming a polymeric material on [a] viologen coated substrate in situ." Applicants can accept that such is true and that therefore the references of record fail to establish *prima facie* obviousness of the invention of claims 39 and 41-55, which all describe formation of a viologen coated substrate, then

covering of this substrate with a polymeric material and irradiating the resulting article.

Applicants submit that neither does any reference of the prior art of record teach or suggest first forming a polymer-coated substrate *in situ*, then forming a viologen salt *in situ*. Accordingly, the invention as described in claims 52 and 56-58 is also not *prima facie* obvious in view of the references of record. Applicants also request that the Examiner take due note of Ms. Liu's Declaration, which establishes that forming the viologen salt *in situ* results in materials that are substantially (*e.g.* up to five orders of magnitude) higher in their conductivity than materials made by grafting of an already-formed viologen to a substrate and then contacting the viologen-coated substrate with a polymeric material and irradiating it.

At the paragraph bridging pages 3 and 4 of her declaration, Ms. Liu expressly states that the lack of cross-linking of the viologen salt that is accomplished by forming the viologen salt *in situ* provides for the high conductivity of the resulting material. Ms. Liu's Declaration therefore provides evidence of unobviousness of the embodiments of the invention described in claims 52 and 56-58 as well. It is legal error for the Examiner to ignore this testimony of the Declarant.

Ms. Liu's Declaration provides evidence that the general step of forming the viologen salt *in situ* provides an unexpectedly large

increase in conductivity of the material formed by irradiating a polymeric material in contact with a viologen salt. As explained in Ms. Liu's Declaration, Examples 1 and 2 of the specification are instances in which the viologen salt is made *in situ* upon a substrate and then coated with the polymeric material. The Example 3 of the specification shows the result obtained when the polymeric material is first coated upon a substrate and then the viologen salt is formed *in situ* upon the polymer-coated substrate and the article is then irradiated. The Examiner should note that the resistance of the article drops four orders of magnitude, to $10^6$ $\Omega/cm^2$, a drop in resistance similar to that observed in the Examples 1 and 2 that are referred to by Ms. Liu.

All of these instances should be compared with the results of the comparative experiment described in Ms. Liu's Declaration, in which an already-formed viologen salt is contacted with a polymeric material and then irradiated. The sheet resistance of the article remains at about $10^{11}$ $\Omega/cm^2$, about five orders of magnitude higher than the resistance of materials made according to the claimed invention.

The Examples 1 through 3 of the specification show that the large decrease in resistance (or increase in conductivity) achieved by the invention is observed whether the polymer is coated upon an *in situ*-formed viologen or whether the viologen is formed *in situ* upon a polymer-coated substrate. These results are consistent with

Ms. Liu's conclusion that the increased conductivity is a result of avoidance of cross-linking of the viologen salt, and furthermore show the generality of the result.

In view of the above, the Examiner's conclusion that a patentable feature of the invention is "forming a polymeric material upon on [a] viologen coated substrate in situ", while true, is too limited. In Applicants' view, the formation of a viologen salt *in situ*, either upon a substrate or upon a polymeric material, achieves conductivity of the material far superior to that achieved by the prior art of record and this more general feature may also confer patentability to the invention.

Applicants submit that the present application well-describes and claims patentable subject matter. Withdrawal of the standing rejections and allowance of the present claims is requested.

Clarification

Applicants wish to respond briefly to a comment made by the Examiner in her "Response to arguments" at page 6 of the Final Office Action. The Examiner states that the Liu Declaration is presented to show superiority of the invention of claim 5 to the invention of claim 4 or claim 7. The Liu Declaration is provided to give evidence of the superiority of the invention as claimed compared to the disclosure or suggestions *of the prior art*.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mark J. Nuell (Reg. No. 36,623) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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